

TITLE OF THE INVENTION

**TOOTHBRUSH WITH OPPOSITELY RECIPROCATING BRUSH HEADS**

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR  
DEVELOPMENT

Not Applicable.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention pertains to an electric toothbrush, and specifically to an electrical toothbrush having more than one cluster of rotating bristles wherein the clusters rotate in opposite directions relative to each other.

Discussion of the Related Art

There have been attempts to enhance toothbrushing and the efficacy of plaque removal from a user's teeth by employing electrical toothbrushes configured with

various rotational speeds of the brush sections or by using a specific angle(s) of brush heads.

In addition to the actual cleaning of the teeth and removal of plaque performed by brushing one's teeth with an electric toothbrush, it is also desirable to massage the gums in order to retain their health, a procedure referred to as prophylaxis.

What is needed is an electric toothbrush with an enhanced cleaning operation.

What is also needed is an electric toothbrush that provides improved gum prophylaxis during brushing.

What is further needed is an electric toothbrush with a plurality of brush heads that provide a plurality of brushing directions to yield enhanced teeth cleaning and plaque removal.

What is further needed is an improved electric toothbrush head configured for the above-described needs.

#### BRIEF SUMMARY OF THE INVENTION

The electric toothbrush of the instant invention is equipped with two brushes that rotate in opposite directions to enhance the efficacy of toothbrushing. By employing two brushes that rotate in opposite directions, the teeth cleaning and removal of plaque is enhanced because the areas that make contact with the toothbrush are cleaned in two directions. Thus, whichever areas and crevices are missed by one brush because the rotation of the brush at the time of cleaning this area did not cover a specific area, can now be contacted by the second brush when it rotates in the opposite direction.

The instant invention also improves prophylaxis of the gums during brushing, because areas that would not be massaged as a result of brushing in one direction are

now subject to being massaged by the second brush rotating in an opposite direction.  
This procedure is further improved if the user switches hands while toothbrushing.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the electric toothbrush of the present invention;

5 Figure 2 is an exploded, perspective view of the toothbrush of the present invention showing various parts thereof; and

Figure 3 is a sectional view and taken substantially along the line 3-3 of Fig. 1.

## DETAILED DESCRIPTION OF THE INVENTION

10 The toothbrush of the present invention is described herein with reference to Figs. 1 through 3. Referring to Fig. 1, the electric toothbrush 10 comprises a handle 20 and a toothbrush member 30. As shown in Fig. 2., the handle defines a housing 23 for housing a motor 26 and a battery power source consisting of batteries 71 for energizing the motor 26. There is also provided a housing for receiving batteries 71 to provide power to the motor, although the batteries 71 are not part of this invention. A handle  
15 cover 22 is removably affixed to the handle 20 in order to allow for easy replacement of batteries 71.

Switch 60 turns the motor on and switch 61 turns the motor off.

A motor shaft 75 is operatively connected to the motor 26 such that when the motor 26 is in an ON condition, the motor shaft 75 rotates in response thereto along its  
20 longitudinal axis.

A toothbrush member 30 is provided that is connected to the handle 20 by a connector 34 as shown in Fig. 2. The toothbrush member 30 comprises a body 31, a drive shaft 32, a transition gear 36, a first bevel gear 38, a second bevel gear 42, a first

brush 46 and a second brush 48. The transition gear attaches to shaft 32. The body 31 of the toothbrush member 30 is configured to house the drive shaft 32 which is configured for coupling via coupling 33 with the motor shaft 75 at a first end such that when the motor shaft 75 rotates, the drive shaft 32 also rotates in response thereto via coupling 33. The drive shaft 32 is coupled to mesh with transition gear 36 at a second end such that when the drive shaft 32 rotates, the transition gear 36 rotates in a plane that is at a substantially right angle to a plane of rotation of the drive shaft 32 (Fig 3).

The first bevel gear 38 is meshed with the transition gear 36 such that when the transition gear 36 rotates, the first bevel gear 38 rotates in a plane that is at substantially a right angle to the plane of rotation of the transition gear 36 (Fig. 3). A shaft 38a extends through bevel gear 38 with its bottom received in a bearing housing 39. The uppermost portion of shaft 38a extends through a hole in plate 51 to the interior of first brush 46 such that the first brush rotates with shaft 38a. The second bevel gear 42 is meshed with the first bevel gear 38 such that when the first bevel gear 38 rotates, the second bevel gear 42 rotates in an opposite direction.

A second brush 48 is coupled to shaft 42a which rotates with bevel gear 42. The shaft extends 42a through second bevel gear 41 with its bottom portion received in bearing housing 45. Bevel gears 38 and 42 are in mesh with each other. As a result of this arrangement, each of the brushes 46,48 rotate in opposite directions while the electric toothbrush 10 is in operation. That is, one rotates clockwise while the other rotates counterclockwise.

As shown in Fig. 3, the first brush 46 and second brush 48 may be comprised of a series of tufted bristles 52, 54 arranged in a substantially circular manner so as to

facilitate easy maneuverability of the brushes 46, 48 within the oral cavity of a user. In addition, a protective plate 51 to protect against gears 36, 38, 42 from foreign particles such as dust, toothpaste and liquids which they may otherwise contact and compromise the efficacy of the gears 36, 38, 42. Hence, the protective plate 51 preserves and  
5 prolongs the life of the electric toothbrush 10.

When the motor 26 operates, it turns motor shaft 75, which in turn rotates the drive shaft 32 via coupling 33. The opposite end of the shaft 32 is secured by coupling 33 to the transition gear 36 to rotate the same. The transition gear 36 has teeth that mesh with the first bevel gear 38 to rotate the same, say, in a clockwise direction. The  
10 teeth of the second bevel gear 42 rotates with those of the first bevel gear so that the second bevel gear 42 rotates counterclockwise since the first bevel gear 38 rotates clockwise. The brushes 46, 48 that are attached respectively to shafts of bevel gears 38, 42 rotate in opposite directions relative to each other; i.e. in the same direction as that of the respective bevel gears to which they are attached.

15 Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses may become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by this specific disclosure herein, but only by the appended claims.